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SYSTEM AND METHOD FOR SHARING FILES VIA A USER INTERNET FILE SYSTEM

Background

The present disclosure relates to file sharing and, more particularly, to a system and method for sharing files via an Internet file system.

Various file sharing protocols have been proposed. One such proposal includes the Common Internet File System (CIFS). The CIFS is intended to provide an open cross-platform mechanism for client systems to request file services from server systems over a network. Further, the CIFS is based on the standard Server Message Block protocol widely in use by personal computers and workstations running a variety of operating systems.

Another protocol is the Secure Shell (SSH) which is program to log into another computer over a network, to execute commands in a remote machine, and to move files from one machine to another

Use of the Internet and the World Wide Web has been characterized by read-only access. Existing protocols such as FTP are good solutions for two-way file transfers.

However, new read/write interfaces will become increasingly necessary as the Internet becomes more interactive and collaborative. Adoption of a common file sharing protocol for the Internet having modern semantics such as shared files, byte-range locking,

coherent caching, change notification, and replicated storage, would provide important benefits to the Internet community.

Conventional file sharing services have been implemented that address some of the issues described above. In such conventional services, an Internet or Web based file server is available for Internet users to store, share, manage and publish files from their Web browser and access them from their or any other Web browser. As such, users can stay connected to their information from anywhere in the world. User files are securely stored on a network and may be shared with any colleague of the users choosing. Most file sharing services support all file types and require no additional software on the desktop making the services an extension of the desktop and a fast and easy way to share and distribute files and content on the Web.

A limitation of the conventional file sharing services is that copying files to and from an Internet file system is difficult and cumbersome. For example, most file upload systems require a special interface that users must become accustomed to, whether that interface is browser based or a special client application. A Web-based Distributed Authoring and Versioning (WebDAV) set of extensions to the Hyper Text Transfer Protocol (HTTP), however, allows users to collaboratively edit and manage files on remote web servers. Since DAV works over HTTP, all the benefits of HTTP are realized that FTP cannot provide. Such benefits include: strong authentication, encryption, proxy support, and caching. Although it is true that SSH does provide some of this functionality, the HTTP infrastructure is much more widely deployed than SSH. Further, SSH does not have the wide complement of tools, development libraries, and applications that HTTP does.

The protocols which use the services mentioned above typically use databases to store information about users and the rights of those users to certain files in a system. As such, anytime a user attempts to access a particular file, a database check will be made to determine if the user has rights to that file. Constantly using a database to allow file sharing between users can become a cumbersome exercise.

Therefore, what is needed, is an application that makes an Internet file system behave in a similar manner as a local or network file system and that administers rights for files in the file system. Also, a directory is used for user account information. Also,

communities of users may be configured to allow the users to easily share folders and files containing information of common interests.

Summary

5 In response to these limitations, a system and method for sharing files via an Internet file system is presented. In such a system, the Internet is treated as an extension of the users own file system where access rights are stored.

10 In one embodiment, an internet file system is configured when a user accesses a server that is configured with an application that creates the internet file system for the user. A directory stores a home folder of the user, where folders and files in the home folder are available at a root of the internet file system. The application provides a first folder and a second folder in a root of the home folder. The first folder contains folders that represent folders and files that have been shared with the user, and the second folder contains objects of the user and communities that are of interest to the user. The application further creates an auxiliary class containing a first attribute, a second attribute, and a third attribute. The first attribute is used to quickly find other users that the folders and the files in the home folder have been shared with, the second attribute is used to store names of the other users and a path of the folders and the files that have been shared with the user, and the third attribute is used to allow the user and other users with common interests to share folders and files of the common interest.

15 20 In another attribute, a first user shares a file with a second user. An application adds the first user to a third attribute of the second user and adds the second user to a third attribute of the first user. The application further adds a path of the shared file and a user name of the second user to a first attribute of the first user and adds the path of the shared file and a user name of the first user to a second attribute of the second user. The application makes the first attribute available through a folder of the second attribute, where the folder belongs to the second user.

25 30 In a further attribute, user objects are created in a directory when, if a user shares a folder with another user who is not registered with an application in the directory, a temporary user object is created with an email address as the name of the other user. The other user submits a registration form and a script determines if the email address

corresponds with the another user. If it does, the temporary user object is updated based on information provided in the registration form.

Brief Description of the Drawings

5 Fig. 1 depicts a diagrammatic view of a network and user internet file system of the present disclosure.

Fig. 2 depicts a diagrammatic view of sharing files and/or folders in a directory of the network of the present invention.

10 Fig. 3 depicts a diagrammatic view of creating users and communities in an application container of the directory of the present invention.

Fig. 4 depicts a computer of the present invention.

Detailed Description

15 Fig. 1 depicts a network 10 that includes a local network 16 which is accessed by a WebDAV enabled application (or browser) 12 via the Internet (or data network) 14. The local network 16 includes a server 18 that comprises an application 20 for creating an Internet file system 26 that a user can access, a file system 22, and a directory 24 which may be a Lightweight Directory Access Protocol (LDAP) directory. The directory 24 includes a user's home folder 28 (which is an attribute of the user object), a WebDAVUser auxiliary class 30 and communities 38 (the group objects are an embodiment of the communities). The directory may be a Lightweight Directory Access Protocol based directory. The root of the Internet file system 26 is roughly equivalent to the user's home folder 28. The files and folders in the user's home folder 28 are available at the root of the user's Internet file system 26. The application 20 also provides two special folders in the root of the user's Internet file system. These are the Received Folders folder 40 (i.e. the first folder), and the Friends folder 42 (i.e. the second folder). The actual name of these folders is configurable. Files in the user's Internet file system 26 are stored on the file system 22, with additional folders and shared files being stored in the directory 24 using the WebDAV user auxiliary class 30. An example of the directory 24 is Novell's eDirectory.

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The Received Folders folder 40 contains folders that represent files and folders that have been shared with the user. For each user that has shared files or folders, there is a folder that includes the name of each user and the files or folders that have been shared. Also there are folders for each community that the user is a member of and in the community folder, there are folders for the other users that are in the community. This folder includes the files and folders that have been shared with the community.

The Friends folder 42 contains the user's objects and community folders that are of interest to the user. Anytime a folder is shared with another user, user objects are added to the Friends folder 42 for both the user sharing the folder and the user receiving the folder (i.e. the another user). This creates a repository of user objects and eliminates the need for performing a search in the directory 24 to find a user that someone may want to share files or folders with. The application 20 creates the WebDAVUser auxiliary class 30. The WebDAVUser is attached to a user object 27 when files are shared with that user, or when that user shares files with another user.

Included in the User Internet file system 26 are Communities 44 which are collections of users with a common interest. Files and folders can be shared between the user and other users or with the whole community. Communities 38 are stored as groups in the directory 24 and the users are members of the group.

The application 20 also creates an auxiliary class 30 for the user of the application. The auxiliary class contains three attributes: Shared Paths 32, Received Paths 34, and Friends 36.

The Shared Paths attribute 32 is used to quickly find which users a file or folder has been shared with. This enables a user to modify the rights granted or to remove the sharing of the file or folder. The Received Paths attribute 34 is used to store the names of users and the path of the file or folder that have been shared with the user. The Received Folder 40 is populated using the information stored in this attribute.

Fig. 2 depicts the sharing of files and/or folders in the directory 24. If User A shares a file with User B 52, the application 20 adds User A to User B's Friends attribute 54, then adds User B to User A's Friends attribute 50. This puts the user objects 27 into the Friends folder 42 of the Internet file system 26, making the user objects readily available for future sharing.

The application 20 further adds the Path:User B key-value pair to User A's Shared Paths attribute 32 and adds the User A: Path key-value pair to User B's Received Paths attribute 56. The shared path via the network file system 22 will now be available through User B's Received Paths folder such as folder 40.

5 If User A 50 modifies rights to the shared path, the application 20 looks at the Shared Paths attribute 32 for User A to determine who the folder has been shared with and looks at the file system's Access Control Lists (ACLs) to determine what rights each user has been granted. The ACL is a list of users and the rights they have to a file. In a preferred embodiment, the ACLs that are used are built into the file system, where as the
10 typical Internet file sharing system would need to store these ACLs in a database. As such, the ACLs described above determine what access rights User B has to the file shared by User A. When User A modifies the access rights, the application 20 modifies the ACLs. A mail message is then generated that sends notification to User B 52 that a file has been shared with him.

15 Fig. 3 depicts the creating of users and communities in the directory 24. The application 20 provides a system for creating new user objects in a directory container 68 which is similar to a folder in a file system as it can contain objects and other containers. If an un-authenticated user enters a web site to access the application 20, the user is presented with a home page 60 that contains a link to a sign up page 62 and to a login
20 page 64. If the user is authenticated, he/she is taken straight to the root of their file system 22. The Sign up page 62 presents a form 62a (such as an HTML form) that receives information regarding the user such as: User name, Password, E-mail address, First Name, Last Name, Address, and Interests (such as Golf, Photography, and Skiing).

If a user shares a folder with another user who is not registered with the
25 application 20, a temporary user object is created with the e-mail address as the name of the another user. When the sign up form is submitted, an ASP script 66 checks to see if the e-mail address entered corresponds with the temporary user. If it does, the user object is updated based on the new information provided. If there is no corresponding user object a new user object 70 is created with the information provided.

30 The ASP script 66 then looks at the Interests 62b that the user has entered. Each interest is associated with a Group object 72 in the application container 68 of the

directory 24. For each interest the user denotes, the user is added as a member of that group. The groups that the user is associated with are then added to the users list of friends 42.

Fig. 4 depicts a computer 80 that includes a processor 82 that is operably coupled to memory 84. The computer 80 may be a personal computer, laptop, server, mobile phone, digital device, and/or any device that can send and/or receive information related to file sharing. The processor 82 may be a central processing unit, digital signal processor, microprocessor, microcontroller, microcomputer, and/or any device that manipulates digital information based on programming instructions. The memory 84 may be read-only memory, random access memory, flash memory and/or any device that stores digital information. The memory 84 is coupled to the processor 82 and stores a computer program (or software application) comprising instructions that, when executed on the computer (or read by the processor), causes the processor to perform the actions described in Fig.'s 1-3 above.

The present disclosure thus enjoys several advantages. For example, a file system and directory are used in combination to allow an application that makes an Internet file system behave in a similar manner as a local or network file system. The application further administers rights for files in the file system and the directory is used for user account information. Also, communities of users may be configured to allow the users to easily share folders and files containing information of common interests.

It is understood that variations may be made in the foregoing without departing from the scope of the present invention. For example, the application 20 may reside on any digital device (such as a mobile phone) and be used in any network (such as a wireless network). It is further understood that other modifications, changes and substitutions are intended in the foregoing disclosure and in some instances some features of the disclosure will be employed without corresponding use of other features. Additionally, singular discussion of items and/or computers located in the network 10 is also meant to apply to situations where items and/or computers exist. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the disclosure.